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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/960,013	09/21/2001	Xiaojuen Yuan	BOE 0176 PA (PD 200164)	4213
7590	09/03/2004		EXAMINER	
John A. Artz Artz & Artz, P.C. Suite 250 28333 Telegraph Road Southfield, MI 48034			ENG, GEORGE	
			ART UNIT	PAPER NUMBER
			2643	

DATE MAILED: 09/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/960,013	Applicant(s) YUAN ET AL.	
	Examiner George Eng	Art Unit 2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office action is in response to the amendment filed 6/24/2004.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 4-5, 8 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niehenke et al. (US PAT. 5,517,687 hereinafter Niehenke) in view of Connerney et al. (EP 0420553A2 hereinafter Connerney).

Regarding claim 1, Niehenke discloses a subharmonic carrier canceling apparatus (9, figure 4) comprising a first splitter (58, figure 4) having a first splitter input for receiving the incoming RF signal (62, figure 1) and separating the incoming RF signal into first splitter in-phase (I) signal carried by a first splitter output (66, figure 4) and a first splitter quadrature (Q) signal carried by a first splitter Q output (68, figure 4), wherein the first splitter Q signal is delayed 180 degrees behind the first splitter I signal, a second splitter (10, figure 4) having a second splitter input for receiving a local oscillator signal (20, figure 4) and separating the local oscillator signal into a second splitter in-phase (I) signal carried by a second splitter I output (22, figure 4), and a second splitter quadrature (Q) signal carried by a second splitter Q output (24, figure 4), wherein the second splitter Q signal is delayed 90 degree behind the second splitter I signal due to the phase shifter (14, figure 4), a first subharmonic mixer (16, figure 4) coupled to the first splitter I output for receiving the first splitter I signal and the second splitter I output for receiving the second splitter I signal in order to generate a first mixer signal, a second harmonic mixer (16' figure 4) coupled to the first splitter Q output for receiving the first splitter Q signal and the second splitter Q output for receiving the second splitter Q signal in order to generate a second mixer signal, and a combiner (18, figure 4) coupled to the first and second subharmonic mixers and receiving the first and second mixer signals (col. 3 line 56 through col. 5 line 15 and col. 9 line 12 through col. 20 line 67). Niehenke differs from the claimed invention in not specifically teaching the combiner combining the mixer signals to generate an output RF signal having reduce second order harmonic closed to the local oscillator frequency. However, Connerney discloses a subharmonic mixer for suppressing both spurious and image signals without requiring separate filters comprising a combiner (70, figure 1) for combining mixer

signals to generate an output RF signal having reduced second order harmonics close to a local oscillator frequency (col. 5 line 24 through col. 6 line 8). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Niehenke in having the combiner combining the mixer signals to generate an output RF signal having reduce second order harmonic closed to the local oscillator frequency, as per teaching of Connerney, because of suppressing both spurious and image signals without requiring separate filters.

Regarding claim 4, Niehenke discloses a subharmonic carrier canceling apparatus (9, figure 4) comprising a first splitter (10, figure 1) having a first splitter input for receiving a local oscillator signal and separating the local oscillator signal into a first splitter in-phase (I) signal carried by a first splitter I output (22, figure 1) and a first splitter quadrature (Q) signal carried by a first splitter Q output (24, figure 1), a first subharmonic mixer (16, figure 1) coupled to the first splitter I output for receiving the first splitter I signal and the incoming RF signal in order to generate a first mixer signal, and a second subharmonic mixer coupled to the first splitter Q output for receiving the first splitter Q signal and generating a second mixer signal (col. 3 line 56 through col. 5 line 15 and col. 5 line 60 through col. 7 line 64). Niehenke differs from the claimed invention in not specifically teaching the combiner combining the mixer signals to generate an output RF signal having reduce second order harmonic closed to the local oscillator frequency. However, Connerney discloses a subharmonic mixer for suppressing both spurious and image signals without requiring separate filters comprising a combiner (70, figure 1) for combining mixer signals to generate an output RF signal having reduced second order harmonics close to a local oscillator frequency (col. 5 line 24 through col. 6 line 8). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to

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modify Niehenke in having the combiner combining the mixer signals to generate an output RF signal having reduce second order harmonic closed to the local oscillator frequency, as per teaching of Connerney, because of suppressing both spurious and image signals without requiring separate filters.

Regarding claim 5, Niehenke discloses a second splitter input for receiving the incoming RF signal (62, figure 4) and separating the incoming RF signal into a second splitter in-phase (I) signal carried by a second splitter output to the first mixer (16, figure 4) and a second splitter quadrature (Q) signal carried by a second splitter Q output to the second mixer (16', figure 4), wherein the second splitter Q signal is delayed 180 degrees behind the second splitter I signal (col. 9 line 12 through col. 20 line 67).

Regarding 8, the limitations of the claim are rejected as the same reasons set forth in claim 1.

Regarding claim 11, the limitations of the claim are rejected as the same reasons set forth in claim 4.

Regarding claim 12, the limitations of the claim are rejected as the same reasons set forth in claim 5.

4. Claims 2-3, 6-7, 9-10 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niehenke et al. (US PAT. 5,517,687 hereinafter Niehenke) in view of Connerney et al. (EP 0420553A2 hereinafter Connerney) as applied in claims above, and further in view of Nazarathy et al. (US PAT. 5,424,680 hereinafter Nazarathy).

Regarding claims 2-3, the combination of Niehenke and Connerney differs from the claimed invention in not specifically teaching the first splitter and the second splitter each comprising a microwave hybrid transformer. However, it is old and notoriously well known in the art of a splitter comprising a microwave hybrid transformer for minimizing the amount of fundamental leaking from an input port from a hybrid to an output port, for example see Nazarathy (col. 6 lines 9-14 and col. 12 lines 24-47). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of the combination of Niehenke and Connerney in having the first splitter and the second splitter each comprising a microwave hybrid transformer, as per teaching of Nazarathy, in order to minimize the amount of fundamental leaking from an input port from a hybrid to an output port.

Regarding claims 6-7, 9-10 and 13-14, the limitations of the claims are rejected as the same reasons set forth in claims 2-3.

Response to Arguments

5. Applicant's arguments with respect to claims 1-14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Puechberty et al. (US PAT. 6,026,287) discloses a mixer with cross connected symmetrical sub-circuit coupling for rejecting harmonics of a second frequency up to a very high order (abstract).

Ovadia (US PAT. 6,327,709) discloses a method and apparatus for filtering interference and nonlinear distortions (col. 2 line 29 through col. 3 line 35).

Seely et al. (US PAT. 4,992,761) discloses a microwave hybrid for use in monolithic microwave integrated circuits (abstract).

7. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington D.C. 20231

Or faxed to:

(703) 872-9306 (for Technology Center 2600 only)

Hand delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, V.A., Sixth Floor (Receptionist).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Eng whose telephone number is 703-308-9555. The examiner can normally be reached on Tuesday to Friday from 7:30 AM to 6:00 PM.

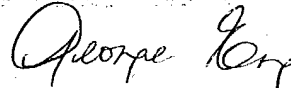
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A. Kuntz, can be reached on (703) 305-4870.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

A handwritten signature in cursive script, appearing to read "George Eng".

George Eng
Primary Examiner
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